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NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

**LITHIUM BATTERIES AND CELLS – CURRENT REGULATIONS AND
EXCEPTIONS**

Lithium Batteries and Cells – Current Regulations and Exceptions

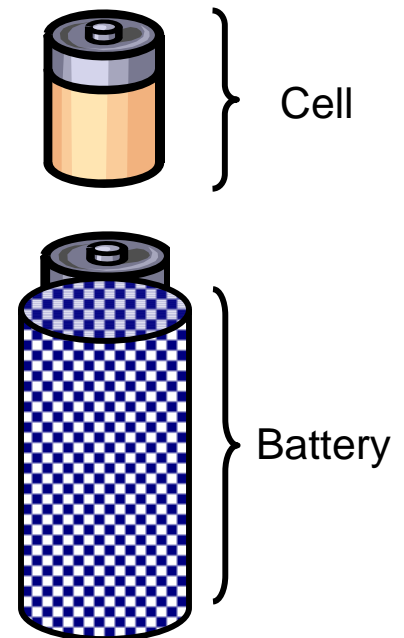
Lithium cells and batteries are regulated as a Class 9 (Miscellaneous) hazardous material and identified as “Lithium battery(ies), UN 3090,” or “Lithium batteries contained in equipment, UN 3091,” or “Lithium batteries packed with equipment, UN 3091.”

U.S. requirements

Currently, the U.S. requirements in the HMR applicable to shipments of lithium cells and batteries depend on their “size,” i.e., the amount of lithium (or equivalent lithium content) in the cell or battery, as illustrated in the chart below:

- “Large batteries” – These cells and batteries must be tested in accordance with the UN Manual of Tests and Criteria; equipped with an effective means of preventing short circuits; packaged in Packing Group II performance level packagings; and identified on shipping papers and with package markings and labels.
- “Medium-sized batteries” - If they pass the UN tests, these cells and batteries do not need to meet the other requirements in the HMR.
- “Small batteries” - The HMR does not require that these cells and batteries be tested and they do not need to meet the other requirements in the HMR.

Excepted Lithium Batteries				
Lithium Battery type	Size limits for untested batteries ¹ 49 CFR 173.185(b) “Small Lithium batteries”		Size limits for tested batteries ² 49 CFR 173.185(c) “Medium sized Lithium batteries”	
	Grams of lithium ³ per cell	Grams of lithium ³ per battery	Grams of lithium ³ per cell	Grams of lithium ³ per battery
Liquid Cathode ⁴	0.5	1.0	5	25
Solid Cathode	1.0	2.0		
Ion	1.5	8.0		
¹ International regulation requires testing for small batteries.				
² International regulations do not give this exception.				
³ Or equivalent lithium content for lithium “ion” cells and batteries				
⁴ International regulations do not have a separate limit for liquid cathode.				



Most primary (non-rechargeable) lithium batteries and cells are forbidden for transport aboard a passenger carrying aircraft.

International requirements

As shown in the chart above, the international regulations (UN Model Regulations; ICAO Technical Instructions and International Maritime Dangerous goods Code) have the same size limits for its small excepted batteries but require the batteries to pass the UN tests.

The international regulations do not provide the exception for medium sized lithium batteries.

The international regulations contain the following additional requirements for “small batteries” when a package contains more than 24 lithium cells or 12 lithium batteries (this requirement does not apply to batteries contained in equipment):

- Each package must be marked indicating that it contains lithium batteries and that special procedures should be followed in the event that the package is damaged;
- Each shipment must be accompanied with a document indicating that packages contain lithium batteries and that special procedures should be followed in the event a package is damaged;
- Each package is capable of withstanding a 1.2 meter drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery-to-battery (or cell-to-cell) contact and without release of contents;
- Except in the case of lithium batteries packed with equipment, packages may not exceed 30 kg.

PHMSA proposed to adopt all of these stricter requirements in the HM-224C NPRM (67 FR 15510, Apr 2, 2002).